

PROCEEDINGS

OF THE

Victoria Institute

OF

TRINIDAD.

FOUNDED

1887.

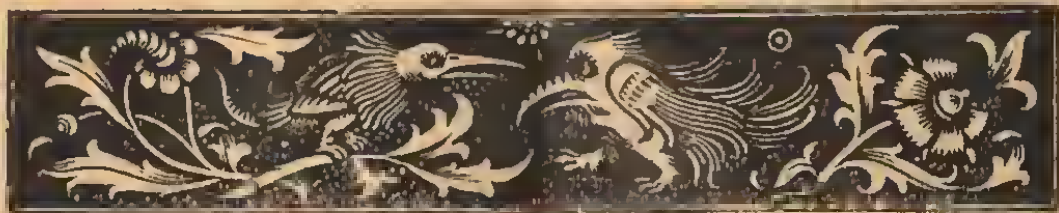


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PAPERS

Read before the Victoria Institute,
Trinidad, 1899.

INAUGURAL ADDRESS.

DELIVERED BY HIS EXCELLENCY, SIR HUBERT JERNINGHAM,
K.C.M.G., ON THE 26TH OF OCTOBER, 1899.

I TAKE great interest in the working of this Institute for two reasons. I like to see men occupying positions of trust and responsibility in the Colony devoting themselves to the instruction of those who have not the opportunity which they themselves in their earlier education have possessed, and I also rejoice because the Institute brings together in a bond of union the men of this Colony who are in humbler spheres and enables them to appreciate what those in higher spheres feel for them, namely, united brotherhood. Although I take it as a great compliment to have been put down to give you an inaugural address it becomes a little matter of difficulty to know what I am to say to you; I refer to my "Embarras de richesse" due to the pace at which this Colony has been going on of late. At the same time the pressure of work that has been put upon me since my return has made me unable to prepare such a paper as you might have expected; but I know you will be indulgent to your Governor. When I looked round for a subject, it seemed to me that having touched three continents in order to reach my Colony I ought to give you a little account of my travels: but then I recollected that you are not a Geographical Society. You are a Scientific Society, and it was suggested to me that as I had gone through the centre of a cyclone it might be interesting to you for me to lecture on

cyclones. The first time I came across one of those horrid visitations called cyclones, I was on my way to the first Colony I ever served, viz., British Honduras. When we had got out of the Mississippi River on the way to Belize, the sea being very rough, I said to the Captain that prudence being the best part of valour I would retire. The Captain came to see me every hour and each time gave me the not very comforting information that the glass was going down. I asked him what that portended and he said "That means that we are in the neighbourhood of a cyclone." I asked "What will occur then?" He said "I never heard of a ship coming out of a cyclone." I have come out of a cyclone this time, and therefore I might give you an interesting account of that event; but I am not a scientist, and here we are in a Scientific Society, and so I had to give up that subject. Then I thought that having gone to Venezuela, and having been received remarkably well in that country, notwithstanding the perturbations which were going on, and dining with the President when we thought the rebels were at any moment going to shoot those who were dining, I would tell you about the revolution, but that too is a subject we have nothing to do with. Then I thought I would give you some idea of the difference between government and administration; because government in my opinion is all foresight, while administration has to do with the present. But foresight into this Colony's possibilities opens out a subject so great that I might lose myself if I entered upon it; and I gave up the idea. I then thought of progress, but it would require several evenings to explain to you that the views of a pessimist are not always in accord with facts and figures. For I am sure that this Colony is doing well; and I wish that I had many years before me to guide you to the triumph which I am perfectly certain will be yours in a very few years. Well then, there remained nothing but the great question of the day. Could I speak to you of that which is in our hearts, the constant thought of our brothers who are fighting for our Queen and country against the Boers? Could I give you an idea of the reasons why that war has become necessary? I should have liked to explain to you the origin of this contest, which was necessary from the first. I should have liked to explain to you why in England there are men of standing and respectability, and men who are looked upon as great politicians, who do not quite agree with Her Majesty's government in the line that they have taken, but whom the Boers have silenced by firing the first gun. I remember that when the Franco-German war took place in 1870, Wurtemberg did not want to join in the march against France. There was in those days a particular hatred of Prussia among the German States; and Wurtemberg would

not move. Prince Bismarck invented a telegram: "The enemy have invaded German territory; no hesitation any longer possible." Wurtemberg accepted that telegram as true, and marched with the rest of Germany against France. The telegram was not true, but the result was the united Germany of the present day. Well, we have not forced the war, or, at all events whatever may have occurred before, the Boers have invaded Natal, action has commenced, and every Britisher must watch events in silence and pray for the success of the mother country.

What remains? All I can do is to impress upon you what the meaning of the Institute is, and how truly, in the sense of the unity which is so essential to Trinidad's advancement, you should, one and all, in whatever class and position you may be, join with us in the effort which is being made for the education of the people. What are the objects of the Society? They have been very clearly put forward in the proceedings of the Victoria Institute for the year 1894. They are the collection and diffusion of information on agricultural, commercial and scientific subjects. Now, has this Society done what it intended? That is the question. So far as agriculture is concerned, we have had lectures on Trinidad as an agricultural Colony, by Mr. de Verteuil; on the care of horses, by Mr. Pegson; on the resources of Trinidad, by Mr. Bert; on the cultivation of cocoa, by Mr. Hart. Lectures have been given upon everything that this colony can produce, and every hint has been given to the colony that can possibly be called valuable. Turning to the commercial interest, we have had a lecture on Trinidad as a Commercial centre, by the Collector of Customs, and although the Collector of Customs is one of my officers, I am glad of this opportunity to say, that he is one of the most conscientious and active workers that this Colony possesses. You have also had a remarkable lecture upon harbour works. It is true that it referred only to Port-of-Spain, but as long as Port-of-Spain is the capital, it is the centre towards which everything must converge. You have had other lectures of similar character, setting forth views which, if not here to listen to them, you may read in the Proceedings of the Society. The Society has not only been true to itself, but it has been loyal and true to its antecedents. It undertook to do the work of the Scientific Association—an Association which should not be forgotten. Ten or eleven scientific men, in 1866 or before that date, under the guidance of a man who, I am happy to say, is on the Committee of this Institute even now—Mr. Guppy—devoted themselves to scientific work and were so modest that they would not allow the whole of their proceedings to be published in book form. That was a mistake which I trust will not be followed by this Institute. The only point

which I think faulty in the Victoria Institute, is that there is no system of publishing in a proper shape proceedings containing vast information, useful to every class of society. I should like that every year the Trinidad Victoria Institute Proceedings should be published, and be taken by everyone here. It should be upheld here; but it should go further, because when we have the honour of possessing among ourselves men of talent and recognised ability, we ought to go beyond the limits of this colony and diffuse knowledge among the West Indian Islands. I was astounded when I read the able papers which were published by the Scientific Association; and I am equally surprised that in so short a time as the existence of this Institute we should have been able to produce such able papers. Some of them are certainly open to criticism, but criticism is the privilege of everyone. I say to the public of Trinidad that I consider that the Committee of this Institute had a duty to perform and that they have performed that duty admirably and truly, and have not in any way whatever endeavoured to supplant the efforts of the Society that preceded it. There is another point. I am always strong on the point of unity. Where people are in small numbers gathering together, means strength. That has been well understood in this Society. Mr. Guppy, who was one of the pioneers of this Society, always wanted to unite with the Victoria Institute a Public Library and also to join to it the whole of the Agricultural Society. If the Agricultural Society could meet here it would give to this Institute another mark of greatness, which it is sure to possess in the future. Everything should be centred in the scientific centre, which is this Institute. Not only is it your Museum, but it is also the centre from which secondary instruction is given at a nominal price. What has the Society not done? It even tried amusing entertainments. There was a French evening devoted to Moliere, and an English evening to Shakespeare. Although those evenings were attended with great success, there is no doubt that to prepare for those evenings required too much effort; and in a climate like ours people are not always ready to come in numbers. Though the Society was successful so far, I think they have undertaken a far better task in the course they have now instituted, viz., classes to form what this Colony wants more than anything else—skilled artisans. I lay stress on the word, and I now appeal specially to my friends who are simple artisans themselves, to remember that even in England the want of skilled artisans is felt. All over the Continent the cry is for men who are so skilled in the work which they are to do that they can claim and get double wages. That is what skill means. It is not to the discredit of this Colony to say that owing to the absence of opportunity such as is offered to you

by this Institute now, the number of skilled workmen is poor and insufficient; and as long as it is insufficient, we must go to England and get men. As Governor of this Colony I should like to see among the applicants for every post a native of this place whom I could select. When I want somebody to drive the engine on board a steamer, I do not want to find someone who has done nothing but drive a cart. We want men with certificates of the necessary knowledge. Follow these classes, and you will thank the Victoria Institute some day for having given you the means of a comfortable and honest living, and not only that, but for raising your country in the opinion of the labouring world. I am so interested in this Institute, and so desirous of seeing it successful, and so grateful to the ladies and gentlemen who have helped it all the time I have been Governor here, that I appeal to the Colony generally to take an interest in its work. On reading a very remarkable address delivered by Mr. Guppy in this very hall, I came across this passage: "Whatever neglect or ill-treatment the Victoria Institute may meet with now or later will be the worse for all concerned. It must in any case be the public Museum and Scientific Institution of the Colony. Neglect or ill-treatment will certainly lead to the impairment of its usefulness; so that when the necessity for the existence of such an Institution becomes properly recognised, people will say: 'Why was such neglect and ill-treatment suffered to be?'" When I read those words I found my excuse for giving you my inaugural address on this subject.

ADDRESS ON TECHNICAL EDUCATION.

DELIVERED BY SIR JOHN GOLDNEY TO THE STUDENTS OF THE
TECHNICAL CLASSES ON THE 7TH OF OCTOBER, 1899.

THE Victoria Institute was built in commemoration of the fiftieth year of Her Majesty's reign. Nothing could be more appropriate to the purpose than the initiation of technical classes to enable those bearing the honourable name of artisans not only to do their practical work, but to know the scientific reasons why they did their work. No person in this world, however clever or good a workman he might be, could possibly fail to learn something if he attended lectures of this sort. At the time when her Majesty came to the Throne, the British artizan of that day was above the workmen of the world. The English artizan was not a more able man than his Continental neighbours, but he had the advantage of living in a country which

had been free for more than a century from civil wars and from the presence of armies marching backwards and forwards. In other countries as soon as workmen were beginning to learn what could be done with coal and iron their industry was upset by wars. There is an example of it even now in some of the South American Republics. The want of peace is opposed to trade. Although England had been fighting abroad, when steam became the great power of the world she was the first to cultivate and understand it. I can remember going down the Rhine in a German steamer on which the engineers were all English and all the words of command were given in English, because there were no German engineers to speak of. The result was that the German and other Continental Governments asked themselves why they should employ all those British Workmen to do the work which they ought to do themselves; and many years ago they started technical schools, of which these lectures are a very humble imitation. The result is that in mechanical art, I do not think there is any difference between the best Continental work and the best British work. The whole of the British Empire now feels that to keep their position in the mechanical and artizan world, it is necessary not only to know the practical work, but to know the reason why certain things should be done. In all these schools the object is to teach people, first of all, that the most honourable thing a man can do is to earn his living by his hands, and that in order to make himself master of his work he must learn the reason why he does things. When these technical lectures were started, the Institute had to call upon those in the Colony who had scientific knowledge to come to its assistance, and there is not a single gentleman with technical knowledge who has not come forward to assist us. Mr. Hahn, Mr. Gillies and Mr. John voluntarily gave up their time in the evenings to assist their fellow colonists by trying to impart to them the knowledge which they had themselves, and it must be as gratifying to them as it is to the Board of Management that you have tried to take advantage of those lectures. Nothing could be more gratifying than the actual results. In the first class there was an introductory address on the 25th of February, the number of pupils was 61, and the average attendance was 30, which was very good indeed. The second course was started on June 3rd and ended on the 9th September. The subject was masonry, and of 28 pupils the average attendance was 15. That was not quite so good, but the result of the examination was very satisfactory. The winner of the first prize got 207 marks out of a possible 261. The Building and Construction class was even better, as the total possible marks was 161 and he got 145. In drawing the work done has been most praiseworthy; and the energy and

perseverance of the students show that they entered the class with that true spirit which ought to make them succeed. I am exceedingly pleased with the result of the examination and I hope that the next class—carpentry—to commence on the 4th of November, will be well attended. Carpentry is essentially a part of building construction. A man may be a very good mason or brick layer, but if he wants to be a master, he must have a knowledge of Carpentry, so that if he makes a contract for building a house he may know whether his sub-contractors are doing his carpentry work well. Take advantage in every possible way of learning the details of the art of every branch of artizanship which is used in constructing a building. You have gone through brick-laying and building construction, and now you have to go into carpentry. Do not give up, as you have done so well hitherto. Nothing would give our dear Queen greater pleasure than to know that you are doing your best to commemorate her glorious reign, by endeavouring to make yourselves equal to the best workmen in the whole of her dominions. A workman is the proudest thing a man can be. A man who can use his hands is far better than one who can only use his head. The superiority of its artizans has made the British Empire what it is.

DESCRIPTION, CONDITION AND PROSPECTS OF TOBAGO.

BY HIS LORDSHIP THE BISHOP OF TRINIDAD.

THE Bishop said that he attributed the Governor's presence to the fact that His Excellency was so charmed with his recent visit to Tobago that he wanted to hear a little more about that island. There were others in the room who knew Tobago as well, and in some respects a great deal better than he did, but he would tell them what a practical outsider had had frequent opportunities of observing of the island, the people and the work that was being done or being attempted to be done in the island. He then proceeded to describe the scenery and the circumstances incidental to a journey round the island on a Tobago pony. The island contained about 73,000 acres, the bulk of which had been alienated; there was only about 2,700 acres of Crown land left, and he hoped the Government would take good care that it was reserved, because if the wood was cut down the island would become very much like Carriacou, where there was not a tree and the rain did not fall, the consequence

being that its future was hopeless. The mountainous part or backbone of the island was for the greater part Crown land densely covered with primeval forest and had been strictly reserved in years past in order that the island might have a sufficient supply of rain. He also advised that the native woods should be preserved for building purposes and that the people should not have to buy American lumber, which was very expensive and of little use for outside work. Scarborough was an exceedingly pretty town from the deck of a ship, but not so when you landed, and although there were traces of former magnificence and wealth, and about sixty years ago, Tobago was said to be the wealthiest island in the West Indies after St. Kitts, at the present day the stranger going through Scarborough pitied the dilapidated and miserable condition of the little town. The Baccholet lighthouse took its name from what was once an exceedingly wealthy and prosperous estate; this estate was now the property of Mr. McFie, who was a short time ago Attorney of the Burnley estates in Trinidad; it was almost out of cultivation now, and the only hope was that the new owner would before long see his way to making things hum there once more. At Roxborough, Mr. Archibald had purchased considerable property and was laying out a very large sum of money. This would no doubt in time encourage others to go and invest their money there to the best advantage they could, and it was from men like that and what they did, that were to be gathered all their hopes of the future prospects of poor little Tobago. At Queen's Bay there was an estate called Betsey's Hope. He believed the name had now been changed to Louis d'Or; this estate had been bought by an English syndicate. The King's Bay estate, he was glad to say, had passed into the hands of gentlemen in Trinidad, and he most heartily congratulated the gentlemen who had acquired that estate, because if they would only do for that estate what it deserved, it would do for them what they in turn deserved. There was a very considerable area of flat land in front and behind, the steep hills and the ravines were crammed with leafy mould that had been dropping there for ages, offering the most fertile soil. All that was wanted was that money should be poured in from both pockets for some little time, as the earth like everything else, would not give you anything unless you gave the earth something for it. After describing the beautiful scenery along the journey, His Lordship said that on the leeward coast owing to its having for years been given up to sugar, there was hardly a tree to be seen upon it, and at the present time it presented a rather melancholy and sterile appearance. He was sorry to say that the people of Plymouth, the second town of the island, were in a state of poverty and great misery. At Mount Irvine Bay

there was, he believed, the only vacuum pan sugar estate in the island—the property of Mr. Kernahan, who had made manly endeavours which all his friends trusted would be crowned with success. Coming to Buccoo and Shirvan, he said Buccoo estate was no longer cultivated, and as showing the pitiful condition to which things had come in some parts of the West Indies, fifty or sixty years ago this estate belonged to an English nobleman, who, being in want of money, sold it for £80,000, and such was the condition of the sugar trade and the fertility of Tobago and the excellence of the work done there, that in two years the purchaser had cleared off the whole sum out of the produce of the estate and put a handsome profit into his pocket. He supposed that would never be done again, but these things served to encourage people who were making efforts. There was the cave that Robinson Crusoe lived in. Some people had their doubts, but there could be no possible doubt about it because they found the skull of his goat, and that skull was exhibited at an exhibition here some years ago, so Tobago must have been Robinson Crusoe's island, and if you rode along the beach you could always see the man Friday's foot marks. He had mentioned the names of twelve bays which were really good ports. The fact of those twelve harbours being there, meant that if they asked for anything at all for Tobago, they must have a steamer. Grenada could not manage with one and got three of them, and besides that, Grenada was in a direct line of traffic with Trinidad, and was also a place of call of a number of ocean going boats every month, a thing that was not likely to be the case with Tobago; so that far better provision would have to be made for Tobago than had been found sufficient for Grenada. He gathered that idea because he knew Tobago—he knew the country thoroughly well, and he knew the water—he had steered boats all round the coast, he had been half drowned in most of the rivers and knew the place thoroughly well, and he knew that in time to come, if they were to get all the produce they could and encourage the planters and working people to add to the wealth of the island, they would have to provide them with a steamer of about 300 tons and of moderately shallow draught, put a few buoys down where there were rocks and shoals—and these were thoroughly well known to the fishermen round the coast—and this steamer would have to run with a tolerable amount of punctuality and be connected with the ocean steamers in Trinidad, and this ought not to be done less than once a week. The roads in Tobago were not carriage roads, but they were good enough for the French who, in days gone by, constructed them for the carriage of cannon, so as to cover every little bay that he had mentioned. The northern part of the island consisted of a kind

of decayed porphyry rock which made the best possible roads, and roads which once made could be kept up at as little cost as possible. All the southern part of the island had been cultivated in sugar except a small part of it which had been planted in cotton. He did not know why they gave up cotton, because Tobago used to grow the best cotton that went to Liverpool, and he believed the indigo grown there was of the best quality. The question was what their attention might be turned to. They knew what had been of enormous assistance to Trinidad and had regenerated Grenada, and they also knew what in the hands of one or two men of pluck and determination was being done in one or two small spots in Tobago. Cocoa and nutmeg cultivation had not been of long standing. He would advise no very large sale of Crown lands for the reason he had given, and he hoped the Crown would be very jealous of whatever forest lands remained in Tobago. There were enormous tracts of land for sale, if any one wanted to buy them. There was no necessity for the Government to distress itself, because people wanted land in Tobago and could not get it. He traced on the map the part of the island that was capable of growing cocoa, nutmegs and other products, such as india rubber, which was the only thing in agriculture that did not seem to be depressed. In going through a large cocoa property in Grenada the other day, he saw nutmeg trees growing under the cocoa trees, and when he suggested that the trees were crowding each other out, he was told that when the nutmeg trees were bearing, the owner would cut all the cocoa trees down and burn them for firewood. The population of Tobago was estimated at about 20,500 people. The great bulk of the population of course were agricultural labourers. There was very little else for them to do, as there was no manufacturing in Tobago. Cases had been told him which he only gave to the audience as he received them—that on one estate pay day came at intervals of five months. Some people said the people of Tobago were good for nothing, but any people would be good for nothing if they were paid like that. He said it was a distinct libel on the Tobago labourer, because it was not his fault if he was idle or lazy. He would not charge the planter, because the fault must lie at the door of the decadence of the great sugar industry whatever might have been the cause of that decadence. In 1828—seventy years ago—Tobago exported 137,000 cwt. of sugar. In 1897, she exported 2,174 cwt. In 1828 she exported 504,728 gallons of rum, and in 1890 she exported 3,700 instead of half a million. In 1828 she exported 8,700 cwt. of molasses and in 1890 she exported 3,864, or less than one half. That was the reason, why the people in Tobago did not work hard—it was because their trade was gone, and very few pay tables

were able to give a man a living wage, he did not mean four or five cents, but something which would give him a margin for comfort and a bit of a holiday and a little bit of luxury in his home—that was what he called a living wage. Some gentleman had told him they could get very fair labour, and another said he had no fault to find with the labour there. The present rate of pay was from 6d. to 9d. a day, that being the ordinary wages for able-bodied men. That, he thought, was sufficient to tell them the condition of affairs in that, at present, unfortunate little island. Skilled artizans got from 18d. to 3s. a day. He did not think a blacksmith or a carpenter in Trinidad would work for that. Tobago has products essentially its own, as distinguished from Trinidad. There had been in times past a most excellent breed of very safe ponies in Tobago. He had a little pony not more than 13 hands high that carried him the whole livelong day. There were plenty of them. He had been told that of late years the stamina of the ponies had not been quite as good as it used to be—that would be a question for Mr Meaden to discuss with the Governor so as to restore to Tobago that excellent class of pony which was a source of wealth to the island. In many parts the land was essentially fitted for the keeping of sheep. At Studley Park, about six miles from Scarborough, there were hundreds of acres of land where guinea grass grew wild like a weed without being cultivated as it was in Trinidad. He was sure large flocks of sheep could be kept, but a first class shepherd must be brought out at a good salary and they must also import sires for the flock of the very best kind. The Warden of Tobago told him the other day that there was decided reason to hope that the revenue of Tobago would go up. In the matter of education, with a population of 20,000, the Government had only been able to spend £500 or £600 a year. In the matter of roads, when Mr. Low was Commissioner, they borrowed a loan from Trinidad which he believed had been wiped out since the island became a Ward of Trinidad, and very little had been spent in public works. Public works would have to be done in the way of roads and probably one or two jetties in some of those harbours; public works included a steamer such as he had suggested. This would be general encouragement to the old planters who were still struggling, and to the new planters who were prepared to lay down their capital if they received proper encouragement and assistance from the Government. Tobago had often been spoken of by the people of Trinidad with rather a curling lip and a smile of pity and scorn, but he was convinced that in the next twenty years if the Government kept its shoulder to the wheel in the way it seemed inclined to do, the people of Trinidad, he was sure, would be exceedingly proud of their daughter next door. At

Sandy Point, where there was a good deal of land suitable for sugar, there were vast tracts of land that might become provision and vegetable gardens for Trinidad and probably other islands in the West Indies.

THE DEVELOPMENT OF THE COLONY BY ROADS AND RAILWAYS.

BY MR. E. R. SMART.

I beg to direct your attention to this Map of Trinidad. You will see that there are three main ranges of hills :—

First, the Northern Range running east and west.

Secondly, the Central Range running from south-west to north-east.

Thirdly, the Southern Range running east and west.

These three ranges divide the Island into four main portions, namely :

- (1.) The North Coast.
- (2.) The North Central District.
- (3.) The South Central District.
- (4.) The South Coast.

There is also a waterparting starting from the northern range of hills running south through Tamana to the Central Ridge dividing the N. Central District into two parts. This waterparting forms a distinct range of hills on the north side, and also on the south side, but towards the centre the elevation falls nearly to the level of the surrounding country forming a plateau called the Aripo Savanna. But at the same time this waterparting is slightly higher than the land to the east and west of it—so that the rain which falls on the west side runs to the Caroni, whilst the rain which falls on the east side runs to the Oropuche. There is also a range of hills forming a waterparting running south-east from Tabaquite to join the southern range dividing the South Central District into two parts. The eastern part is the basin of the Nariva and the Ortoire, the western part forms the basins of the Guaraeara, the Cipro and the southern Oropuche.

Now, in the year 1887, the situation was as follows: The North Coast was provided with a large number of bays, where sloops could shelter fairly well, planters could ship their produce at these bays without much difficulty. Therefore, the best way to develop the North Coast, speaking generally was, to open up short roads running from the northern range of hills to the various shipping bays. The southern and south-eastern coasts where they were fertile could be developed in the same way, also the coast from Cedros to San Fernando. The basin of the Caroni was fairly well supplied with means of communication by a railway, and by a large number of roads, and the south-western basin of the Guaracara and the Cipero was provided with a large number of railways and roads. The district of the southern Oropuche east of Siparia, was certainly cut off from the rest of the world—but that could be opened up very easily by a system of roads converging on San Fernando. But with regard to the two large districts in the east central portion of the Colony, namely, the basin of the Oropuche, and the basin of the Nariva and Ortoire, some special mode of treatment seemed advisable. There are large districts stretching from the centre of the Island up to the east coast, the coastline is short in comparison, and being exposed to the easterly winds, and having no bays, shipping operations are carried on with difficulty. The Manzanilla district, one of the most fertile parts of the Colony, had absolutely no stone suitable for metalling a road. It was agreed, therefore, that a railway should be made almost entirely with that one object in view, to take road material into the district, and then that roads should be constructed from the railway in all directions. I will now describe the selection of the route for this railway, and the position of its terminus. It was considered advisable to creep down south as much as possible so as to keep on the good land; in fact, if the country had permitted it, we should have gone right down to Tumpuna, taken the left bank of the Caroni and worked eastward some three miles to the southward of the present line. But it was found that the lateral ridges starting from the main central ridge, came right down to the Caroni river, making it impossible to run a railway there except at very great cost for cuttings and embankments. Many have said, why did you stop at Sangre Grande? Firstly, it was considered unnecessary to put a railway where you could put a road. Now, having arrived at a spot within eight miles of the coast, we were within the limiting distance for transport of metal. A road could be built to the sea coast, and metalled from the terminus. Secondly, the last five miles would have been very expensive for a railway ending on a coast where there was no harbour. Thirdly, because the actual position of the

Sangre Grande station is, in my opinion, an excellent site for a terminus from the point of view of the road constructor. Main roads can be worked out from that central position like the rays of a fan in all directions. Now, gentlemen, what more is required? Roads converging on that railway. The scheme as it stands at present is only half complete—to use a familiar simile, half the bridge is most substantially built, the other half is a yawning chasm. It is quite impossible for me in the course of this lecture to point out the course of all the roads the district requires. I would merely point out that wherever you see rivers running through very rough country, the best course for main roads is on or near the waterparting between them. I do not advocate roads of 30 feet in width. I suggest only that the trace for the road should first be selected with the greatest care, with easy gradients and few bridges, if possible on the ridge top, but where the ridge runs up into a peak, then that a bridle track not more than 10 feet in width should be cut out on the side of the hill. As funds permit, these roads should be metalled from the railway, or coated with burnt clay, but supposing there is no money for either one or the other, still a road thus located fairly well drains itself, and mud on a level track is not so dangerous as mud on a gradient of 1 in 4. You may be amused at my suggesting a road only ten feet wide, but on consideration, it is evident that if a road runs through absolutely level country that only requires a drain on each side, and the earth taken from the drain thrown on the road to make the formation level, the cost of such a road is almost the same if you make it 30 feet as if you make it 10 feet, but when you come to side cuttings, there is a vast economy in a ten foot road over a broader one. The sections which I show illustrate this statement as in the case of the ten foot road, you save 8-9ths of the earthwork, and the expense of a ditch on the upper side. I am informed that the new road on the Island of Chacachacare was cut out on the side of the hill to a width of only five feet, and yet proved wide enough to allow all the material used in the construction of the lighthouse to be carted up to the top. I must now leave the Oropuche District and direct your attention to the basins of the Nariva and Ortoire, near the mouth of which is the district of Mayaro. The next question to be considered was, how far should we go. I recommended it should stop at a point about 12 miles from Mayaro where the vega became a swamp, and where the hills which came down to the swamp were merely hard gravelly ridges, but if financial consideration prevented the line being continued so far, then I suggested it should at least go as far as Tabaquite. Now, why should Tabaquite be the temporary terminus? Because it is an excellent starting point for a large

number of roads. If the railway is extended down to the swamp, you have the opportunity afforded you of metalling all the roads within ten miles of the railway from the quarries on the Baccus River. If the railway is not extended, the roads must be constructed without metal, and trust to sandstone and burnt clay, which can be procured at certain places in the district. But supposing these roads are traced out properly, there will be very few bridges to make, they will be practically level, and planters can make their own roads to them, also fairly level. In fact, by working out a system of roads on a scientific system, and not hap-hazard, you can have a first-class road within one mile from every man's house, and every ten-acre planter can have a decent and fairly level footpath up to his own door. Now, here I would point out how very much easier and cheaper it is to run roads or railways in the direction of the physical features of the country rather than at right angles to them. Hills are not scattered at random over a country; they run in ridges, and the ravines and rivers run between them; in fact, the hollows have been seoped out by the action of the rain during long periods of time. To make a slight digression; thousands of years ago one of the main branches of the Orinoco undoubtedly flowed across the centre of Trinidad depositing in some places sand, in other places mud, and in the salt water outside coral grew. After many ages the land was upheaved, and the rains began to tear away the soil—now the sandy and muddy tracts which were slightly upheaved, have remained such to this day like the Aripo Savana. The sandy tracts which were more upheaved and stood therefore at a steeper gradient, were torn out by the rain, and thus were formed the sandy hills and precipitous gorges of the country near the Talparo river. The muddy tracts which were sufficiently upheaved were also torn out by the rain, and this is the origin of the Naparima clay district. Where there was coral, the mixture of coral with mud and sand after upheaval, was also torn out by the rains, and this is the origin of those splendid calcareous soils which stretch not in an absolutely continuous line, but are broken up into fingers and toes from Princes Town to the point near the swamp where the main central railway was originally intended to stop. Those of you who have travelled in the country may have noticed some of our broad natural soil roads after their yearly levelling and cleaning: you will see a small plain of soil canting in some particular direction. After a few months of rain, if you travel over the same spot, you will see the whole surface of the ground cut up into minute ridges and hollows. If the soil is pure sand you will see tiny ridges standing sharply up and the ravines deeply seoped out. If the soil is clay, the ridges are elevated only slightly above the hollows. There

you have the central districts of Trinidad in miniature. The rains have re-produced on the road in six months what the rains have produced on the district at large during geological periods of hundreds of thousands of years.

Gentlemen, I would ask you from this little illustration to try and picture to yourselves the appearance of the central district of Trinidad if the forests were removed and you were to look down upon it from a balloon. It would look exactly like that natural soil road after six months rain: keeping now this appearance strictly in view, it must be evident to you that if a road or railway is laid out, generally speaking, in the direction of the ridges or intervening valleys, it may be kept at any easy gradient—but if forced contrary to nature, the road is tossed up and down ten times in a mile, ten bridges are wanted every mile, and the road when made, can never become a cart road, still less a carriage road or a bicycle track. True enough, you may ease the gradients by winding down to the valleys and up on to the ridges—but you double the length of the road in this way, you spend a great deal of money in side cuttings, and the road even then can never be so level as when run along the ridges, and leaving out the question of macadam; the mere formation and bridge building mounts up to £2,000 a mile instead of £200. Now, here I approach a question which I think may evoke considerable difference of opinion—I hold strongly to the idea that roads as a rule, should converge on a light railway as far as possible at right angles, and that there is no pressing necessity to put a road immediately alongside of a railway. You cannot have a first-class road brought to every man's door, but you accommodate a much larger number of planters by letting the main roads separate from the railway over as large an area as possible, and letting the railway itself supply the place of a main central road. The idea in the minds of those people who in 1887 initiated the present railway extension was thus: To have a light railway run through the country chiefly to carry road metal to make roads; they even proposed, where possible, to let the railway run on the existing roads and work the railway as a tram line. Surveys of the Main Eastern Road, the Caparo Road, and the St. Helena Road were made in 1888 with this intention. There was to be no money spent for years on railway stations. Huts were to be built on the side of the line, wherever the line met a road or where the line passed through a large estate. These huts were to accommodate the planters' produce, exactly the same system, in fact, as is adopted on the sea coast of the Island with regard to the coast steamer. It was taken for granted that at first the passenger traffic would be small, and the system of working

generally was to be as follows : One 12 ton locomotive only was to be employed on the line, it would start from the Junction at any rate once a day at a fixed hour with one passenger coach at least, and as many goods or ballast trucks as were requisite, it was to travel 12 miles an hour, and stop to pick up traffic and put it down not absolutely wherever anyone wanted but at very frequent intervals if required—the charge for passengers was to be one uniform tariff of 6d. for any distance and the guard would issue paper tickets from a roll like the clerk at the wicket gate at a race course. The train would return from the terminus at the other end also at a fixed hour. If the original plan of construction had been carried out of light railways suitable for 12 ton engines travelling 12 miles an hour, the money saved on station buildings and long sleepers and heavy ballasting, and fencing, would have been sufficient to construct the main central railway down the Nariva to a point opposite the Rio Claro Rest House. If the original idea of working had been carried out there would have been no loss on the daily working : and if roads at £200 a mile were made to converge on them the cost of the latter would be more than defrayed by the value of the Crown Lands sold. In Western Europe railways were made to enable passengers to travel with greater comfort and speed, or to transport goods with greater security and regularity than by the then existing system of canals and roads. Roads and railways in Trinidad are wanted to open up the country, to allow the Crown Lands to be sold and cultivated, and thus develop the natural resources of the country which are now lying dormant. A country cocoa planter would be delighted to travel to town lying on the top of his cocoa bags rather than have no opportunity of getting his produce to market at all. I now propose to direct your attention to the character of the soil found in the different parts of the district. Taking first the country served by the Sangre Grande Railway ; on leaving Arima the soil is very poor, the hills are either formed of sand or clay, but the river valleys are fertile, and some of the most valuable estates in the Colony are found on the banks of the Talparo, Tumpuna and Cumuto rivers. As you get farther south the country improves, and round about Tamana the land is very rich, containing a large proportion of calcareous matter ; and this fertile soil extends in all directions, not in large continuous sheets but in fingers and toes. Of the Northern parts of the district I can speak very little of from actual experience. I have been told, however, by others that there are fine stretches of country here and there at the base of the Northern Range of hills. But there is one district the high character of which no one can mistake, Manzanilla and El Branche. Here there are

thousands of acres of land of the highest character, a great deal of which has been already purchased, and is merely waiting for a few bridle tracks to be laid out, to give the people an opportunity to settle on them and cultivate them. But with regard to the basin of the Nariva, I can speak with more certainty, because for upwards of twelve months I was constantly camping out in that district, and travelling over it in every direction. In a few words I will describe the main features. The fertile soil of Tamana extends also in fingers and toes some way down to the south, but there are stretches of rather hard gravelly soil in between. But more to the south you find the broad vegas of the Nariva, the Cush and the Charuma. Here there are again thousands of acres of most fertile vega soil in the broad valleys of these rivers, capable of growing cacao in abundance, and these vegas extend to the Nariva swamp. But it is rather to the country lying still more to the south that I would direct your attention; there we find large tracts of country in which hills and dales are all fertile to the highest degree. This district is the El Dorado of Trinidad and a considerable quantity of land along the Mayaro trace has been taken up. The railway was designed to pass through the fertile Nariva valley and along the outskirts of the fertile undulating country. To the south of this in the valley of the Ortoire, and to the east of it towards Mayaro, the land becomes sandy, stony and comparatively barren, to improve again as you actually arrive near the sea-coast of Mayaro. The vega of the lower Ortoire seems to be too sandy to allow of cocoa cultivation. At the present time this vega is covered with forests of Mora timber, and it is possible that timber of a still more valuable kind might be grown in the district—but leaving out of account the possibility of these lands being utilized, I consider I am making a safe estimate in saying that omitting the Oropuche district, the south-east central district contains as much good land suitable for cocoa cultivation as all the rest of the island put together, and all that the planter requires to induce him to buy it and work it, is a hundred miles of ten feet bridle tracks converging on the Tabaquite terminus. In one part of the district the Warden of Savana Grande must have opened up one hundred miles of traces for roads on excellent sites, not always on the rigid scientific system I advocate along the natural lie of the country, but as well as the exigencies of the sale of Crown Lands permitted him—and at a mere fraction of the cost which I estimate as necessary to make a decent bridle track. These traces have been of the greatest utility to the planter, and have resulted in the sale and opening up of large districts which, without those traces would now be still undeveloped Crown Lands. In other districts spaces 30 feet

wide have been reserved for roads which can never be of the slightest use to the road constructor, for they run in absolutely straight lines over hill and dale. I am now bringing my lecture to a conclusion. I would merely add that no more delightful trip can be made by those who love natural scenery than to go to Tabaquite by rail, and spend two or three days in exploring the upper reaches of the Nariva and Baccus Rivers, and that no more interesting trip can be made by those who love natural history, and have the instincts of a sportsman than to travel down the valley of the Nariva. The life is rough, but for men of ordinary health and strength, most healthy and enjoyable. If, instead of going to the Islands during the dry season young men would take a circular tour in the district, provided with a Montserrat Spaniard as hunter and guide, and a few strong country labourers as porters, they would come back with a wider experience, and with a still greater idea of the wealth and resources of their own Colony.

